

***FORMICA DUSMETI* EMERY, 1909, AN IBERIAN ENDEMIC ANT SPECIES: DESCRIPTION OF THE MALE AND DISTRIBUTION (HYMENOPTERA: FORMICIDAE)**

XAVIER ESPADALER¹ and CRISANTO GÓMEZ²

¹C.R.E.A.F. Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain; e-mail: ibec5@cc.uab.es

²Departament de Ciències Ambientals, Universitat de Girona, 17071 Girona, Spain

Abstract.— The male of the iberian endemic ant *Formica dusmeti* Emery, 1909 is described. The shorter scape and hairless appendices differentiate those males from those of the closest species *F. frontalis* Santschi and *F. truncorum* Fabricius. The distribution of *F. dusmeti* is updated.



Key words.— Hymenoptera, Formicidae, *Formica dusmeti*, iberian, male, morphology.

INTRODUCTION

F. dusmeti is a wood ant, constructing dome nests with plant debris or pine needles. Nests may be found under stones though sometimes they use old stumps, always with plant remains accumulated near the nest entrance or covering more or less the stump. Its biology is probably similar to the well known "rufa-group". "Le mâle diffère peu de celui de *truncorum*" (Santschi 1932). This is the short and uninformative description of the male of *Formica dusmeti* Emery, 1909. Santschi was right. This species, whose biology is virtually unknown, has had a rather confusing history: Tinaut and Martínez (1998) when describing the male of *F. frontalis* Santschi, 1919, also an Iberian species, have correctly disentangled the puzzling of those two Iberian endemics. *F. frontalis* had never been before formally recognised as a good species. Both taxa have been variously related to *F. truncorum* Fabricius, 1804. The three species *F. truncorum* Fabricius, *F. dusmeti* Emery and *F. frontalis* Santschi have a similar coloration because of the reddish head with a dark spot of the workers and queens and are probably a monophyletic group. The history of taxonomical changes concerning both species has been summarised by Tinaut and Martínez (1998).

The finding of a huge population of *F. dusmeti* in the Pyrenees allowed us to find sufficient males, that eclosed from cocoons belonging to two nests from two localities. Here we describe those males and offer the distribution for the species, as is presently known. Cephalic measures on 20 males, mm (minimum–mean–maximum); other measurements based on 10 males. The morphology (25 males studied) follows Francoeur (1973):

HL – head length; maximum head length, from occiput to apex of clypeus

HW – head width; maximum head width

SL – scape length

CI – cephalic index (HW*100/HL)

SI – scape index (SL*100/HW)

ED – maximum eye diameter

EI – eye index (ED*100/HW)

AW – alitrunk width; maximum trunk width, at the level of tegulae

AL – alitrunk length

AI – alitrunk index (AW*100/TL)

PH – petiole height; maximum petiole height in side view.

***Formica dusmeti* Emery, 1909**

Material examined. Description based on material from Bescaràn, Lleida, 1750 m, 4 July 1991, leg. X. Espadaler, and Arànsér, Lleida, 1800 m, 12 July 1997, leg. X. Espadaler.

Description. Male (Figs. 1, 2). HL 1.40–1.52–1.64; HW 1.72–1.88–2.08; SL 1.44–1.58–1.68; CI 116.2–123.6–129.7; SI 79.1–83.9–88.8; ED 0.72–0.75–0.80; EI 37.5–40.3–41.6; AL 3.20–3.57–3.72; AW 2.00–2.17–2.24; AI 53.7–60.9–66.2. PH 0.92–1.02–1.24.

Body entirely black. Tip of mandibles and legs, except for the blackened coxae, reddish yellow. In a few males one or two terminal tarsomeres are darkened. External genitalia yellowish. Wings infuscated.

Head broader than long. Occipital margin variable, from slightly convex to slightly concave. Ocelli 0.16. Frontal furrow as a very fine shining line, sometimes nearly obsolete, not reaching the median ocellus. Clypeus with or without a carina; if present it runs from the middle to the anterior margin. In a half of the males there is a transverse depression, visible in profile, running near the anterior margin. Mandibles usually with a single apical tooth; in a few males the basal margin is not rounded but produced in a sharp corner as a second poorly developed tooth. Palp formula 6:4. Head surface with subdued shine. Frontal triangle shining.

Thorax entirely matt but for the shining middle region of propodeum. Petiole variable, with a straight dorsal margin or a wide dorsal concavity. Long hairs present on the entire surface but for the middle zone of dorsal margin of the petiole.

Whole of the body covered with a dense pubescence. Pilosity from subdecumbent to erect. Numerous hairs on dorsum of gaster. Tibiae without hairs on extensor surface. Eyes with micropilosity (0.03). Genitalia without any distinctive characteristic but for the colour, bright orange-reddish.

Males and workers have been deposited in the author's collection (X.E.) and in the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw (Poland).

GEOGRAPHICAL DISTRIBUTION

This is not an easy question to settle. Until recently, many authors have confused *F. frontalis* with *F. dusmeti* and, consequently, literature data are unsecure. We have checked as much samples as possible from all that has been published under the names *F. dusmeti* or *F. frontalis* (noted with * in the following account). The distribution, as is presently known, is reported based on provinces, references added and comments as needed. All localities are in Spain:

Albacete: Cerro Peña Blanca (Tinaut and Martínez 1998)

Burgos: Cubillos* (Tinaut and Martínez 1998)

Jaén: Nava de Paulo*; Mt. Empanadas* (Espadaler 1997).

León: Peredilla*, workers, 8 June 1983 (Espadaler leg.); Villalbina (Tinaut and Martínez 1998)

Lleida: Arànsér*, 1800 m, workers, winged females, males; Bescarà*, 1750 m, workers, winged females, males (Espadaler leg.)

Logroño: Collado de Sancho Leza*, 1400 m, workers, winged females, 14 June 1990 (Espadaler leg.)

Madrid: Peñalara (Emery 1909); S^a de Guadarrama (Martínez 1987)

Navarra: no locality given (Tinaut and Martínez 1998)

Soria: Pineda de Almazán* (Collingwood and Yarrow 1969); Vinuesa*, 1100 m, females, 4 August 1986 (Espadaler leg.)

Teruel: Tramacastilla* (Collingwood and Yarrow 1969); Sierra de Albarracín (Martínez and Tinaut 1996)

Zamora: Cubillos*, workers; Galende*, (Collingwood, personal communication, 1996)

We have been able to locate with precision the altitude for some samples of both species and *F. dusmeti* is found at higher altitudes (mean \pm s.d.: 1550 \pm 275 m; n=6) than *F. frontalis* (mean \pm s.d.: 1160 \pm 450 m; n=15).

DISCUSSION

Formica dusmeti seems to be less abundant than *F. frontalis*. In special, it seems absent from Portugal (see comments on *F. dusmeti* in Collingwood and Prince 1998). We have been unable to locate the original Portuguese material

studied and determined as *F. dusmeti* by Santschi in 1932, coming from three localities (a queen from Soure, a worker from Santarém and a male from Juguieiras). The comments by Santschi on pilosity of the queen are in agreement with characteristics of *F. frontalis* – not of *F. dusmeti* – and, so, there is a possibility that Santschi's *F. dusmeti* males belong in *F. frontalis*. It remains to be confirmed the presence of *F. dusmeti* in Portugal.

The males of *F. dusmeti*, as compared with those of *F. frontalis*, have a shorter scape for a given head width and, accordingly, a different scape index (Table 1). None of the

	<i>F. frontalis</i>	<i>F. dusmeti</i>	t-value	d.f.	p-value
HL	1.53	1.52	0.45	38	0.65
HW	1.87	1.88	-0.43	38	0.66
SL	1.66	1.58	4.58	38	< 0.001
CI	122.3	123.6	-1.25	38	0.21
SI	88.8	83.9	5.70	38	< 0.001
ED	0.77	0.75	0.92	18	0.36
EI	40.9	40.3	0.89	18	0.38
AW	2.10	2.17	-1.13	18	0.26
AL	3.52	3.57	-0.81	18	0.42
AI	59.8	60.9	-0.58	18	0.56
PH	0.97	1.02	-1.46	17	0.16

Table 1. Comparison of biometrical measurements of males of *F. dusmeti* (Arànsér, Lleida; 12 July 1997; Espadaler leg.) and *F. frontalis* (Sant Llorenç de Morunys, Lleida; 10 July 1989; Espadaler leg.). Measures in mm. T-test for independent samples, with sequential Bonferroni's correction. See text for abbreviations.

other measured variables do show a statistical difference between those two species. A summary of morphological differences we have found to differentiate the males of *F. dusmeti* and *F. frontalis* are in Table 2; see also Figs 1–4. *F. truncorum* males (Figs 5 and 6; table 2) are also very distinct from both iberian endemics, with its much developed pilosity on eyes, scape and legs. The shorter and hairless scape of *F. dusmeti*, its hairless tibiae and merely pubescent genae allow for a differentiation of both species. Tinaut and Martínez (1998) describe the eyes and scape of the males of *F. frontalis* as hairless. In a series of > 60 males of *F. frontalis* we have collected from Sant Llorenç de Morunys (Lleida), eyes have some minute hairs and scapes have many short, subdecumbent hairs on dorsal and ventral surfaces. There is probably intraspecific variability of the males *F. frontalis* in eye micropilosity and scape pilosity.

	<i>F. truncorum</i>	<i>F. dusmeti</i>	<i>F. frontalis</i>
Scape index	85.04 (3.3)	83.9 (3.0)	88.8 (2.4)
Eyes	>25 long hairs	~ 20 short hairs	~ 10 short hairs
Scape	hairy	hairless	hairy
Tibiae	suberect hairs	hairless	suberect hairs
Genae	subdecumbent hairs	pubescent	subdecumbent hairs

Table 2. Morphological differences of males of *Formica truncorum* (Ochotnica Górna, Gorce Mts, Poland; Yamauchi det. leg.; n=4), *F. dusmeti* (Arànsér, Lleida; 12 July 1997; n=20) and *F. frontalis* (Sant Llorenç de Morunys, Lleida; 10 July 1989; n=20). Mean (s.d.).

ACKNOWLEDGMENTS

To the staff of the Museu de História Natural of Coimbra for comments about the original material of Santschi. To C. Baroni Urbani (then at the Naturhistorisches Museum Basel) for the loan of type material of *F. frontalis* and to K. Yamauchi (Gifu, Japan) for the loan of samples of *F. truncorum*. We also thank Cedric A. Collingwood for the comments on doubtful samples and for his kind acceptance at Skipton in 1996; and for all the efforts he has done on helping iberian myrmecology.

REFERENCES

- Collingwood, C. A. and A. Prince. 1998. A guide to ants of continental Portugal. Boletim da Sociedade Portuguesa de Entomologia, Suppl. 5: 9–49.
- Collingwood, C. A. and I. H. H. Yarrow. 1969. A survey of Iberian Formicidae (Hymenoptera). Eos, 44: 53–101.
- Espadaler, X. 1997. Formicoides de las Sierras de Cazorla, del Pozo y Segura (Jaén, España) (Hymenoptera, Formicidae). Ecología, 11: 489–499.
- Francoeur, A. 1973. Révision taxonomique des espèces néarctiques du groupe *fusca*, genre *Formica* (Formicidae, Hymenoptera). Mémoires de la Société Entomologique du Québec, 3: 1–316.
- Martínez, M. D. 1987. Las hormigas (Hym. Formicidae) de la Sierra de Guadarrama. Boletín de la Asociación española de Entomología, 11: 385–394.
- Martínez, M. D. and A. Tinaut. 1996. Nuevas especies de Formicoides (Hymenoptera, Formicidae) para la Sierra de Albarracín (Teruel). XII Bienal de la Sociedad española de Historia Natural, Tomo extraordinario: 174–177.
- Santschi, F. 1932. Fourmis du Portugal. Memórias e Estudos do Museu Zoológico da Universidade de Coimbra, Ser. 1, Zoologia Sistemática, 59: 1–3.
- Tinaut, A. and M. D. Martínez. 1998. Taxonomy and distribution of *Formica dusmeti* Emery, 1909 and of *F. frontalis* Santschi, 1919 (Hymenoptera, Formicidae). Graellsia 54: 31–41.

Received: October 1, 1999

Accepted: December 15, 1999

Corresponding Editor: S. A. Ślipiński
Issue Editor: D. Iwan



Fig. 1. *Formica dusmeti* Emery. Arànsér, Lleida, Spain. Male cephalic capsule, frontal view.

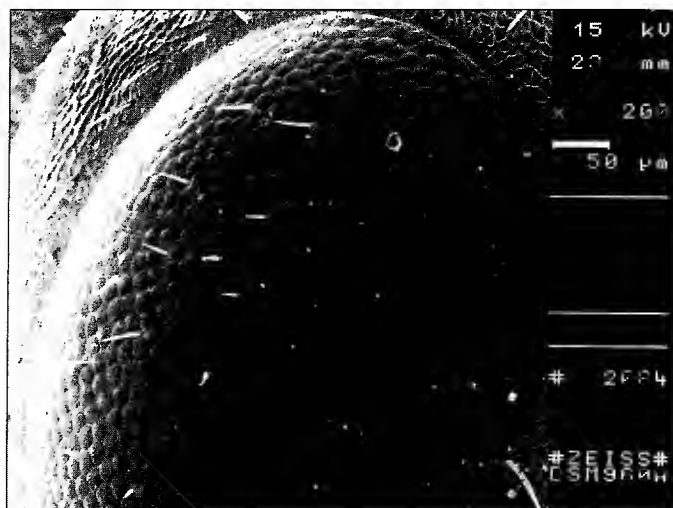


Fig. 2. *Formica dusmeti* Emery. Arànsér, Lleida, Spain. Male eye, showing a short micropilosity.



Fig. 3. *Formica frontalis* Santschi. Sant Llorenç de Morunys, Lleida, Spain. Male cephalic capsule, frontal view.



Fig. 4. *Formica frontalis* Santschi. Sant Llorenç de Morunys, Lleida, Spain. Male eye, with rare micropilosity. This is an extreme example as usually there are some 10 microscopic hairs.



Fig. 5. *Formica truncorum* Fabricius. Ochotnica, Gorce Mts, Poland. Male cephalic capsule, frontal view.



Fig. 6. *Formica truncorum* Fabricius. Ochotnica, Gorce Mts, Poland. Male eye, with abundant and long pilosity.